USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002ME3B

Title: Evaluating Changes in Water Chemistry as Risk Factors For Atlantic Salmon in Downeast Maine

Project Type: Research

Focus Categories: Climatological Processes, Acid Deposition, Management and Planning

Keywords: lakes, acid rain, land-water interactions, water chemistry, climate

Start Date: 05/01/2002

End Date: 04/30/2004

Federal Funds Requested: $23,311

Non-Federal Matching Funds Requested: $39,292

Congressional District: 2

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Abstract

The number of salmon returning to Maine rivers has declined annually for more than a decade. There are a number of chemical agents that have been suggested as potentially responsible, including endrocrine disruptors such as PCBs, herbicides such as arsenic and velpar, and natural aluminum from acid leaching of soils. We propose to evaluate recent changes in surface water chemistry that may decrease the mitigation of anthropogenic chemical agents, or increase the toxicity of these substances.

Pilot data from downeast Maine support the hypothesis that a general decline in ionic strength is underway in surface waters of the northeastern U.S. In particular, a decline in base cations may be removing some of the mitigation capacity of surface waters. Alternatively, an apparent increase in dissolved organic carbon may be increasing the chelation of some toxic substances and decreasing toxicity. The potential balance between these factors, and the uncertainties in the trends in acid-base status, lead to this proposal to address these uncertainties for downeast Maine. These data are directly relevant to the current debate over the Endangered Species Act listing for salmon.

The scope of work includes collecting new data for six tributaries of downeast rivers to compare to data collected in the 1980s (Haines et al., 1990), and on 72 upland streams sampled in 1987. In addition, existing data will be evaluated as part of this project: regional seepage lakes, the EPA long term monitoring program, the Bear Brook Watershed in Maine (BBWM), and a regional assessment of data being performed by the PIs for the New England Governors and Eastern Canadian Premiers. A hydrologic assessment will be made with the assistance of USGS, Augusta, to aid in the interpretation of chemical changes.

Funding for this work is requested only for the first year, as seed money to attract funding from the Atlantic salmon stakeholders. These stakeholders have expressed their intention to fund this work, but money will not be available for at least a year. We are jump-starting the process.